

## Licensable Technologies

# Single-Rotor Turbine Engine

### Applications:

- Jet engines for small aircraft
- Turboshaft engines for helicopters, tanks, and other turboprop aircraft
- Residential distributed-power units
- Portable personal-power units
- Distributed power generators for industrial and commercial sites

### Benefits:

- Very high power-to-volume ratio
- Simple integrated rotor design
- Lighter and less complex than standard centrifugal gas turbines
- Significant power density
- Reduced cost to manufacture and operate

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### Summary:

Scientists at Los Alamos National Laboratory have invented a single-rotor turbine engine (SRT), a revolutionary centrifugal-turbine design featuring the compressor and turbine sections cast as a single piece.

The one-piece compressor/turbine design reduces engine complexity and weight by integrating the rotors, eliminating seals, and shortening the overall length of the engine. It also reduces manufacturing, operating, and maintenance costs while increasing the engine's standard operating lifetime. This SRT design uses simple conventional air-passage shapes that provide both a radial and axial flow pattern through the single rotor, which allows the radial intake air flow to cool the turbine blades and turbine exhaust gases in an axial flow used for energy transfer. An electric generator in the engine adapts the invention for power generation. The SRT engine design cools the critical turbine section, allowing the engine to operate at higher temperatures and use fuel much more efficiently than a standard turbine engine. The invention can also be designed for more conventional temperatures by being constructed from less costly, lower-temperature alloys.

The SRT can be used in any application that currently uses the centrifugal gas turbine. It can be used for jet engines for small aircraft, turboshaft engines for turboprop aircraft like helicopters, in residential distributed-power units and portable personal-power units.

### Development Stage:

This technology has been tested by outside contractors. Their Phase I and II evaluations are available at [www.lanl.gov/orgs/tt/license/fact\\_sheets.shtml](http://www.lanl.gov/orgs/tt/license/fact_sheets.shtml)

### Patent Status:

U.S. Patent 6,430,917  
 U.S. Patent 6,807,802

### Licensing Status:

Available for exclusive or non-exclusive licensing. The Laboratory is actively seeking partners for commercialization.

